CAMERA LUCIDA DRAWINGS

illustrating

DEGENERATIONS of the PYRAMIDAL TRACT

resulting from

UNILATERAL LESIONS in CEREBRAL MOTOR CORTEX

in the

CAT, DOG, and MONKEY.

accompanying Thesis

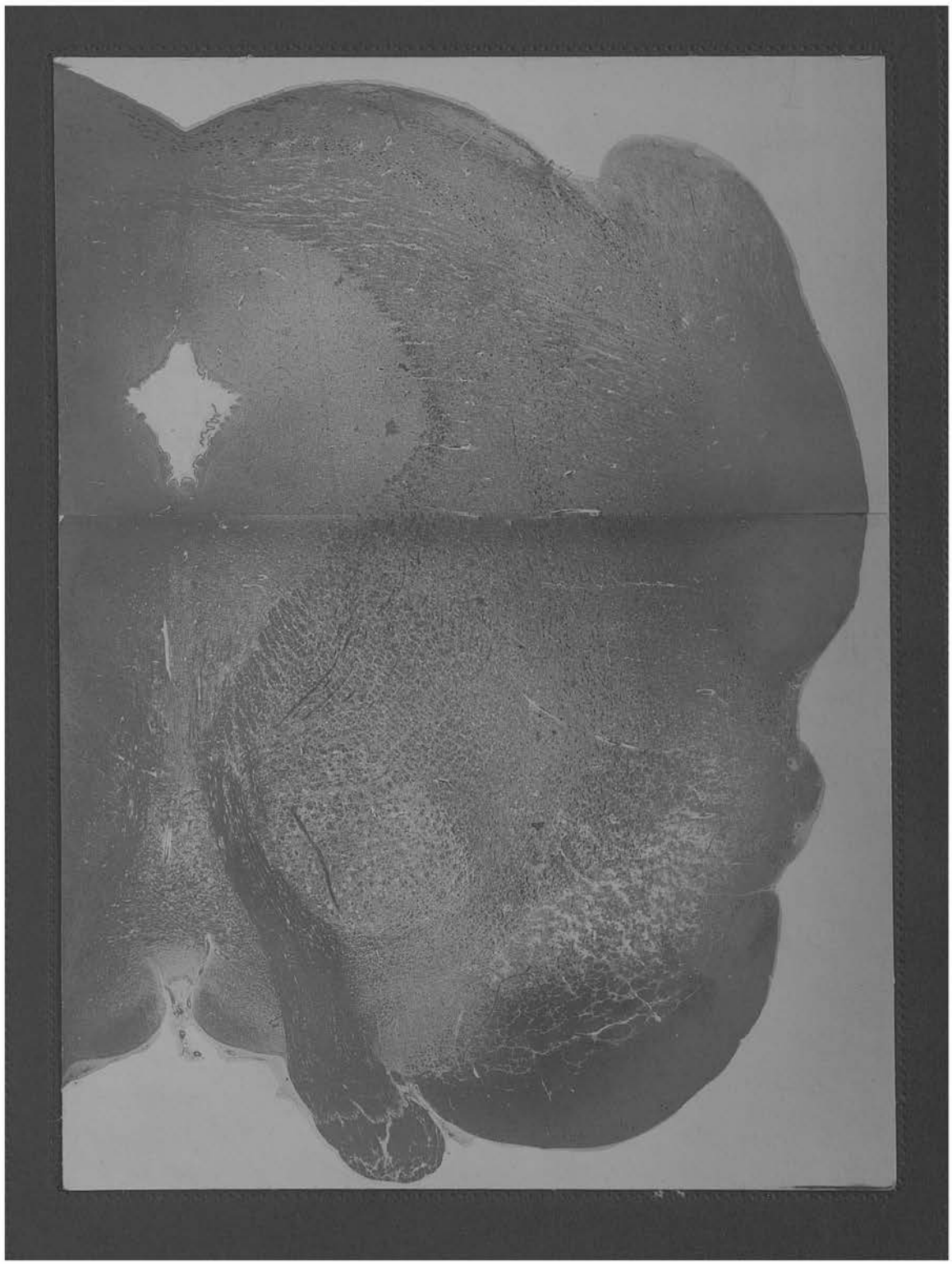
by

SUTHERLAND SIMPSON.

April 1901.

Cat

Photograph from section from which the drawing on next page was made. X20 diam.



Cat. – Lesion in Motor Cortex of same side.

Transverse Section of Mid-brain through Anterior Corpora Quadrigemina. X10.

(Only one half of the section is shown)

Observe the degenerated crusta (black) lateral to the emerging root of the 3rd nerve; fibres (interrupted black lines) passing backwards from it through the tegmentum to the ant. corp. quad. of the same side, and some crossing the middle line through the roof of the aqueduct to that of the same side. No degenerated fibres are seen passing towards the central grey matter in which lies the nucleus of the 3rd nerve.

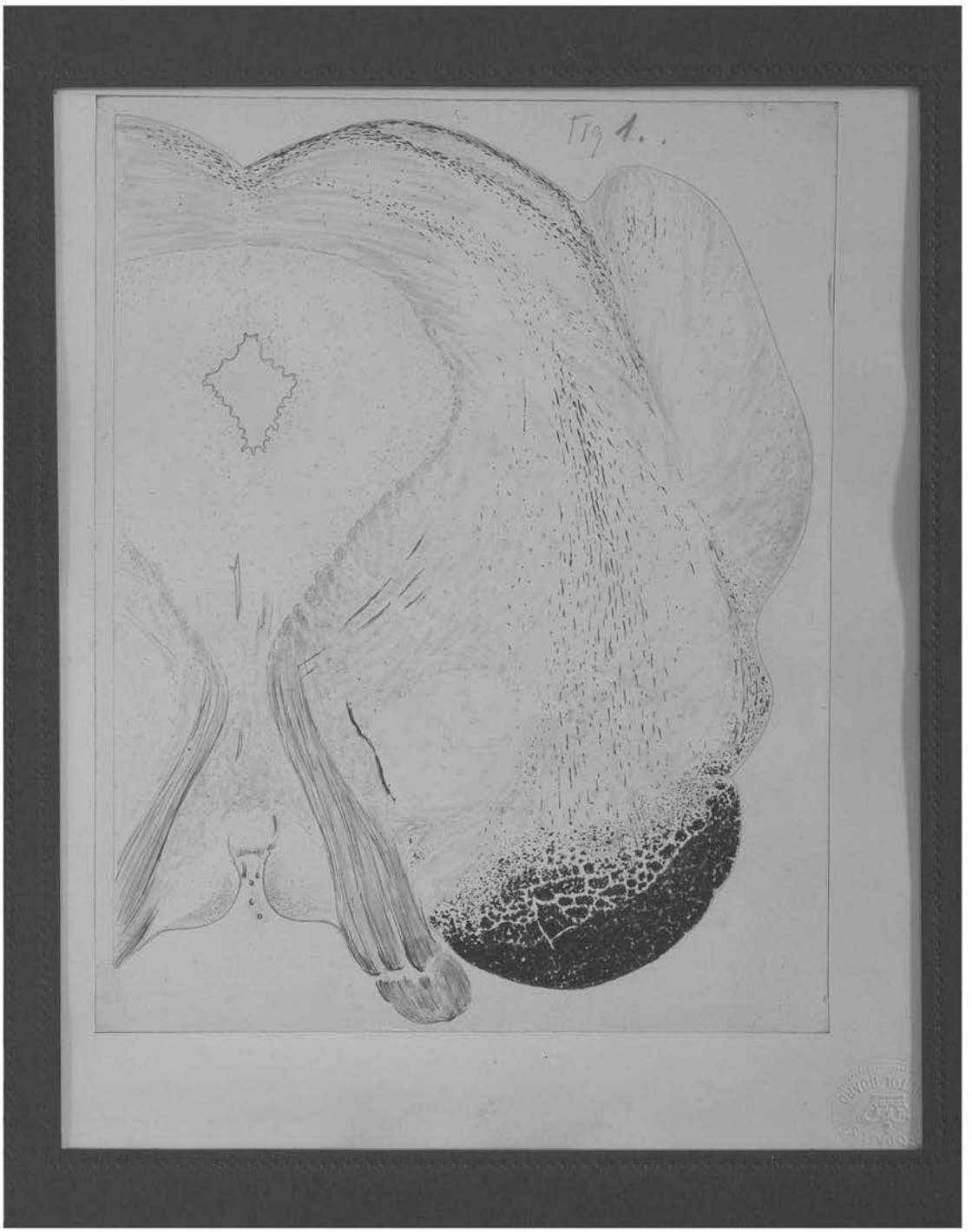
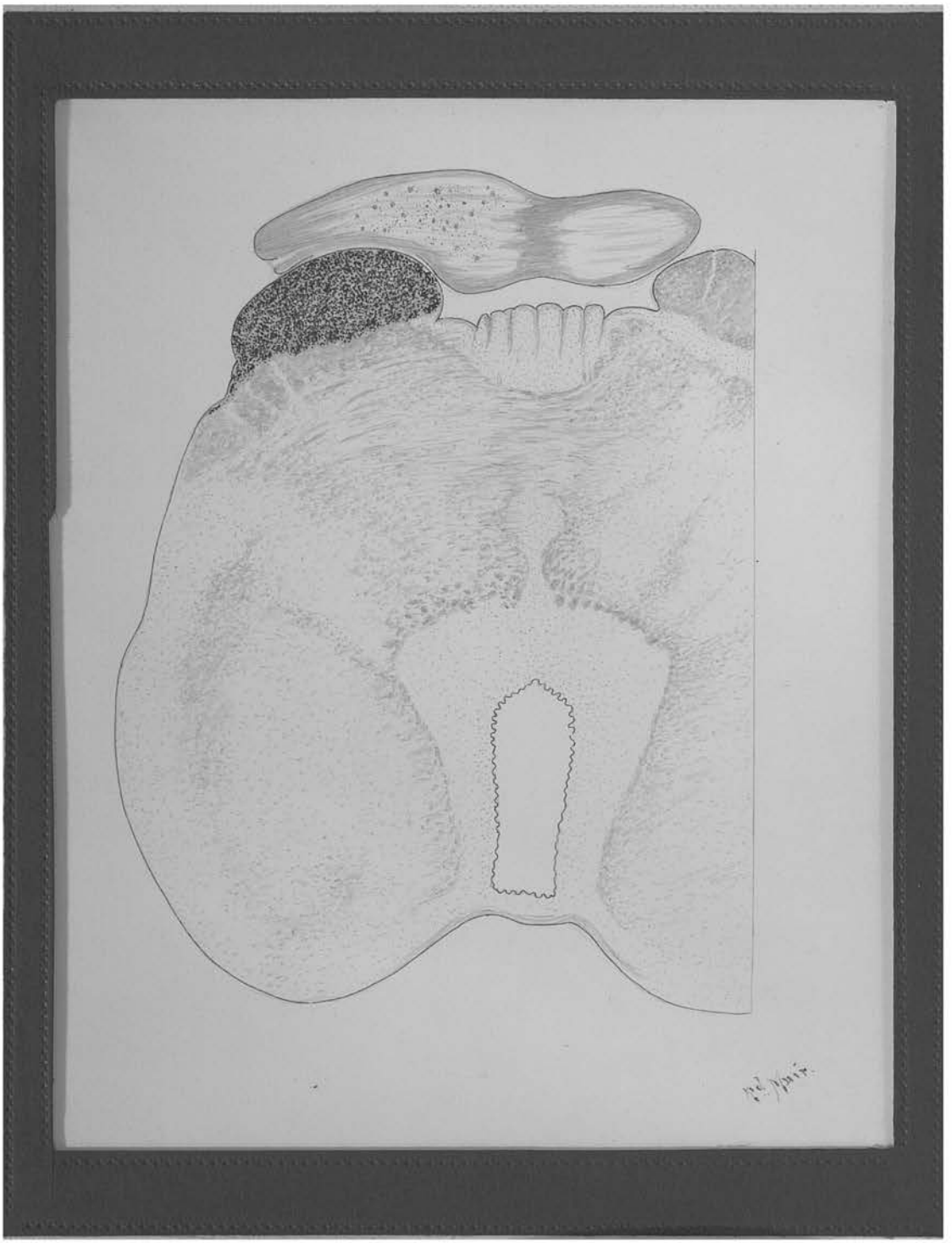


Fig 1.

Cat

T.S. Lower part of Mid-brain through Posterior Corpora Quadrigemina. X1

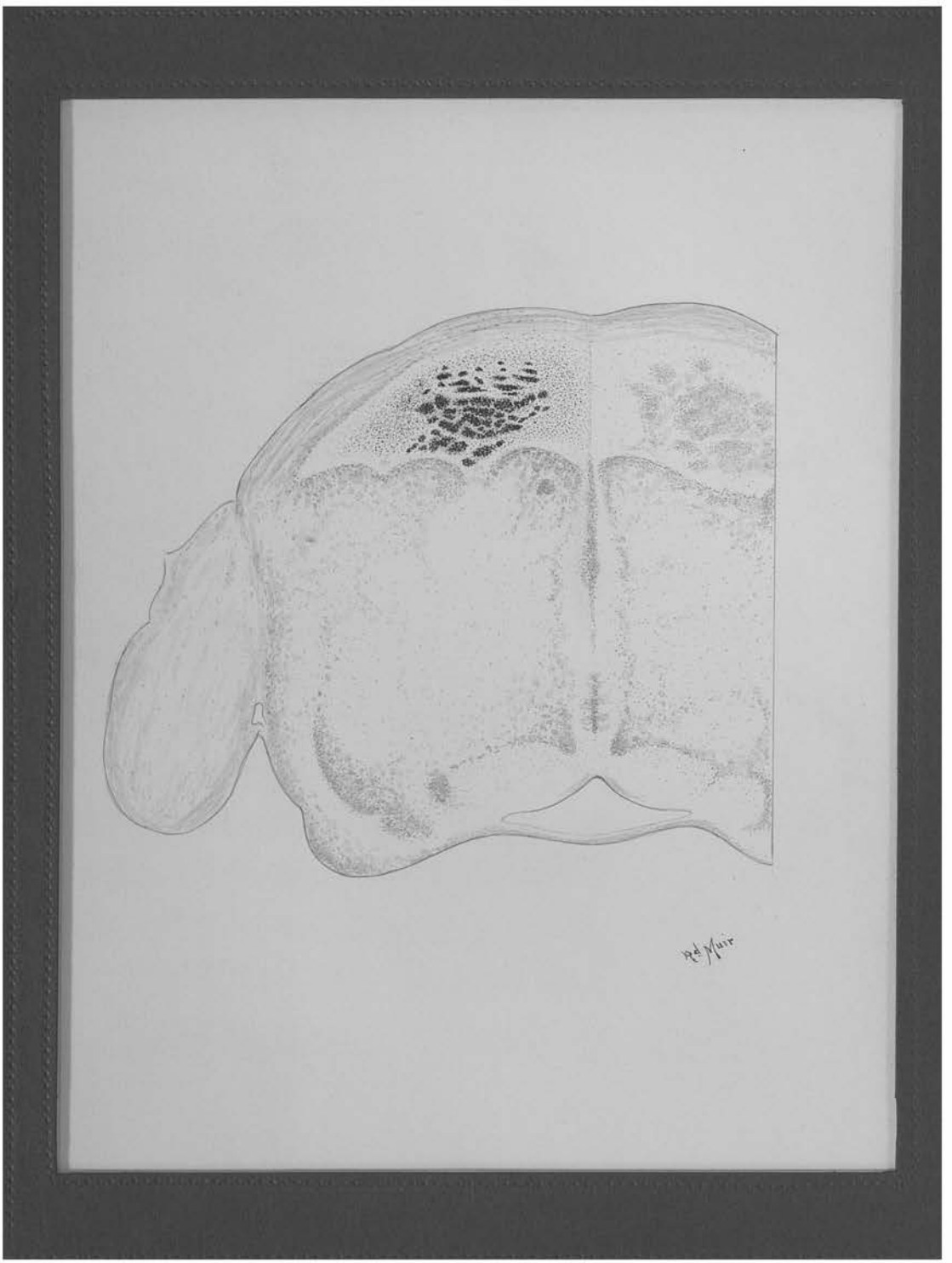
The crusta on the side of the lesion is completely degenerated but no fibres are visible passing backwards from it. The upper extremity of the transverse fibres of the pons ~~are~~ is seen in section in front of the crura cerebri.



Cat.

T.S. through Middle of Pons. X 10

The pyramidal bundles are de-
-generated (black) on the side of
the lesion and scattered amongst
the cells of the nuclei pontis around
these bundles there is a large amount
of fine degeneration (represented in
the drawing by minute black dots).



Cat

Drawn from same section as last more highly magnified (× 25).

This shows more distinctly the fine degeneration in the nuclei pontis.

Cat

Drawn from same section as last more highly magnified (× 25).

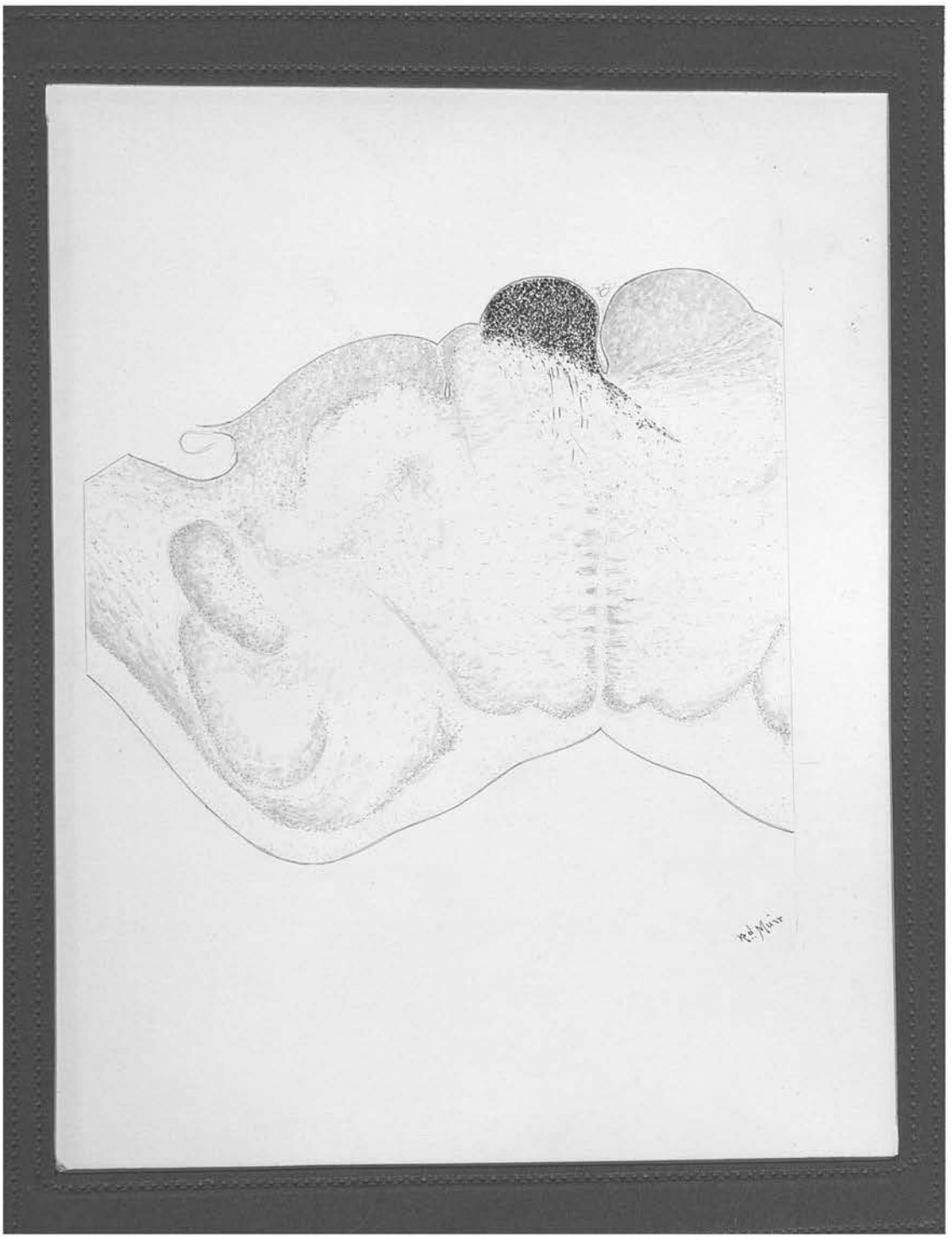
This shows more distinctly the fine degeneration in the nuclei pontis.

Fig 2.

Cat.

T.S. through lower part of Pons. X 10

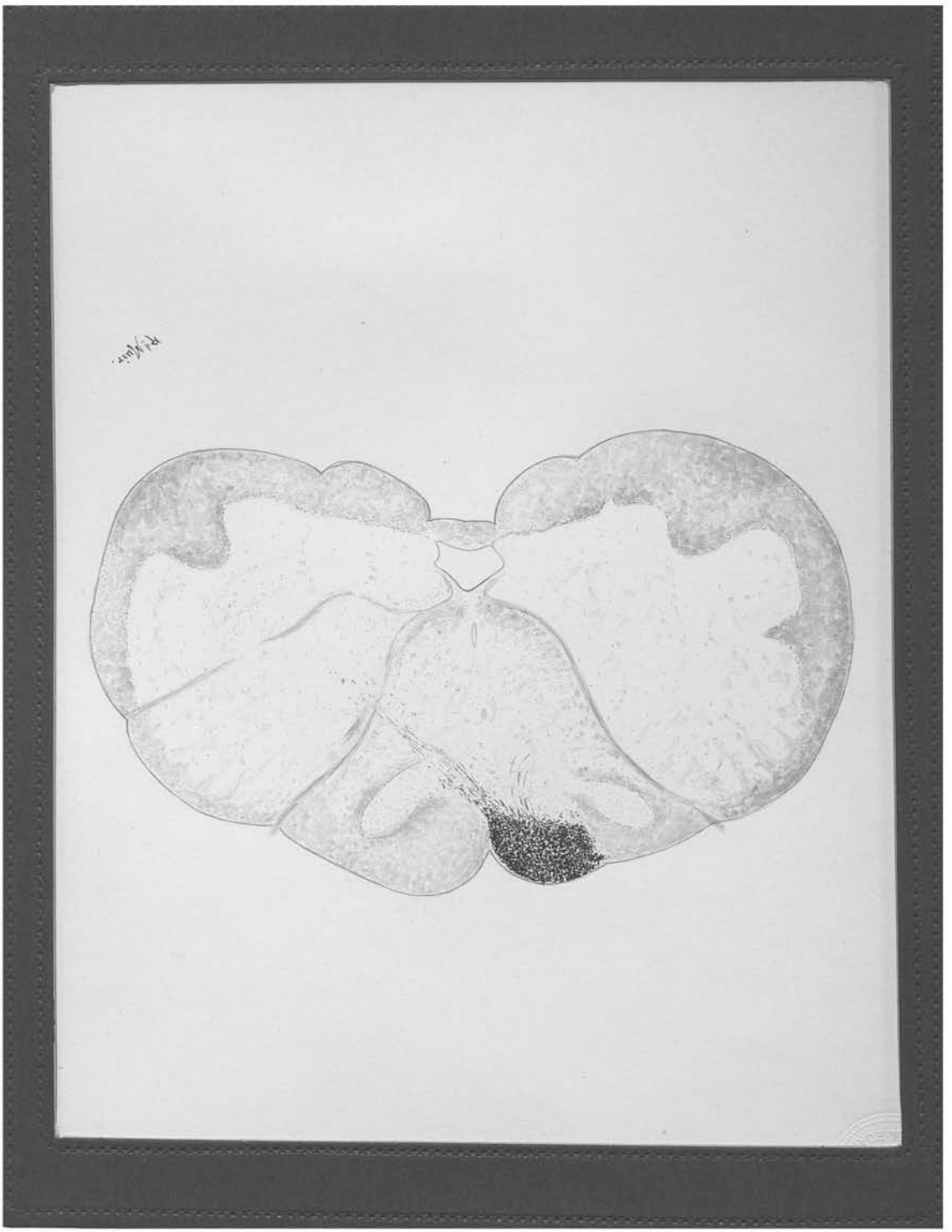
The degenerated anterior pyramid is smaller in transverse section than the normal one. A few fibres are seen to leave its posterior border, some cross the middle line and disappear in the formatio reticularis of the opposite side while some pass directly back-wards and are lost in that of the same side.



Cat

T.S. Medulla Oblongata thro' Lower Extremity of Inferior Olivary Nucleus.

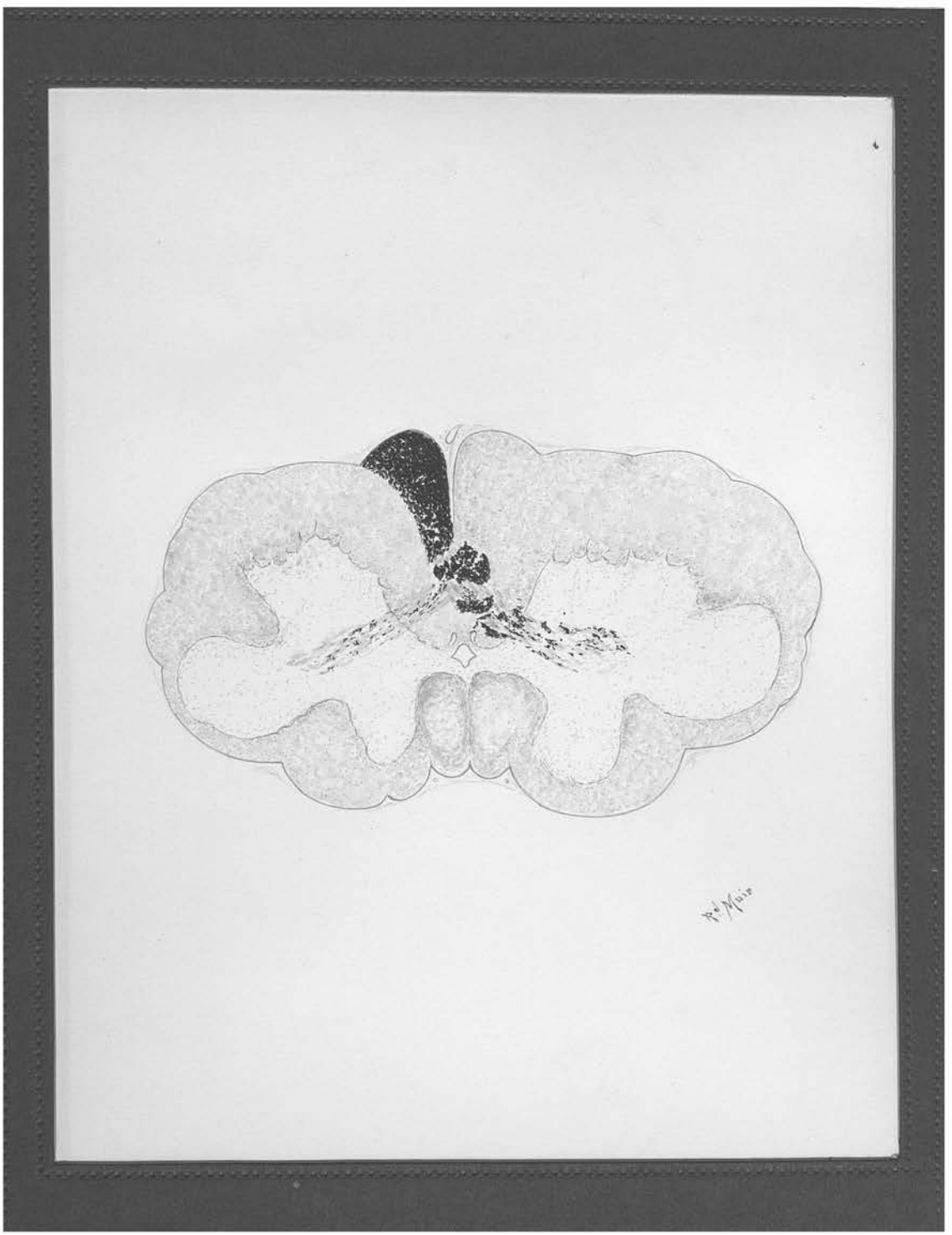
Decussating and direct fibres leave the posterior aspect of the degenerated pyramid as in the last drawing.



Cat.

T.S. lower part of Medulla Oblongata through middle of Pyramidal Decussation. X 10 diam.

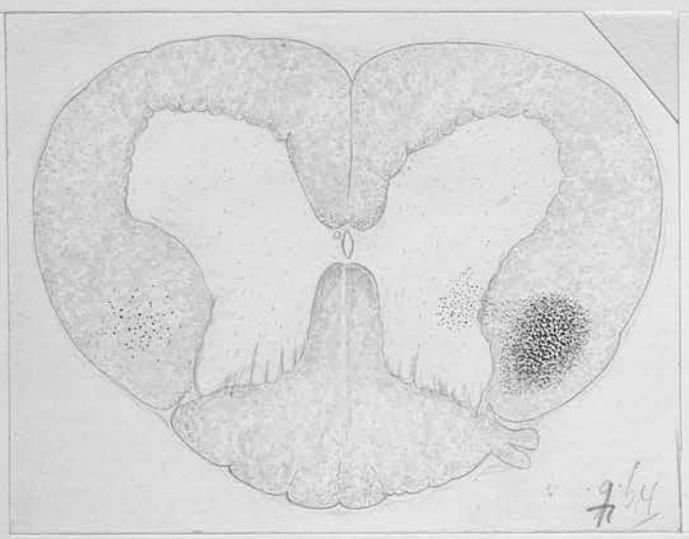
Observe the main mass of fibres from the degenerated pyramid crossing the middle line to the opposite side: a few curve round and pass backwards thro' the grey matter in their course towards the pyramidal tract of the same side (as the lesion): there are the homolateral or direct lateral pyramidal tract fibres.



Cat

T.S. Spinal Cord thro' 6th Cervical Segt.

The crossed pyramidal tract occupies a rounded area in posterior part of lateral column on the side opposite to that of cortical lesion. A few fibres can be seen passing in towards base of posterior horn and some fine degeneration is visible in grey matter adjacent. A few homo-lateral fibres occupy a similar position on side of lesion. No direct (anterior) pyramidal tract is visible.



Cat

T.S. Spinal Cord thro' Mid-dorsal Region.

Crossed and direct lateral pyramidal tracts seen as in cervical region but each occupies a smaller area and contains fewer fibres.

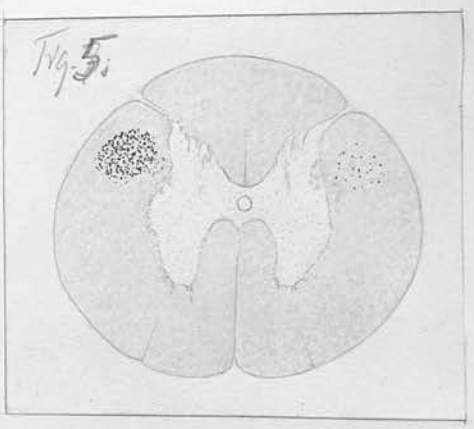
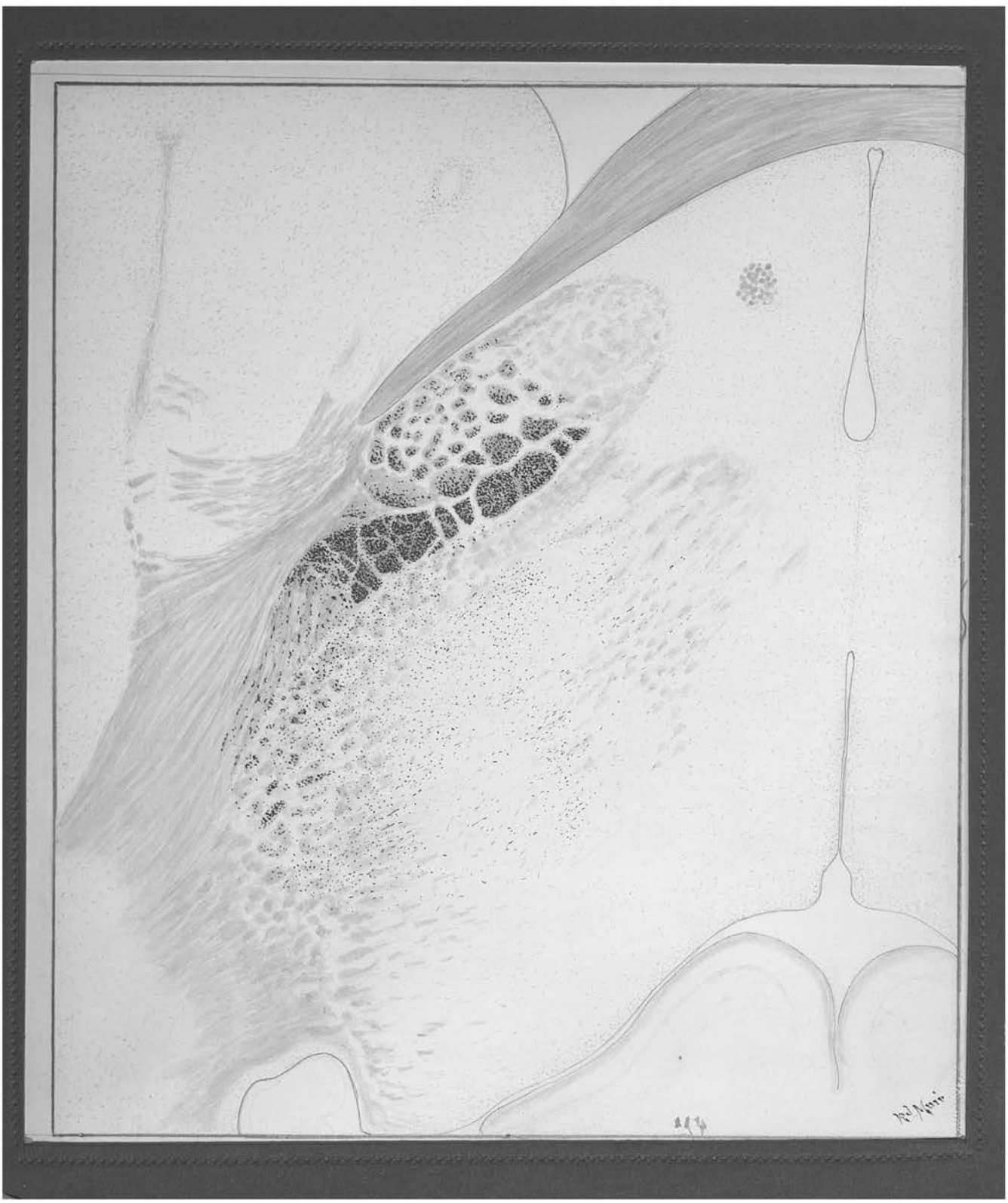


Fig. 5.

Dog. – Lesion involves whole motor area on one side.

Coronal Section through Posterior Part of Optic Thalamus. X 9 diam.

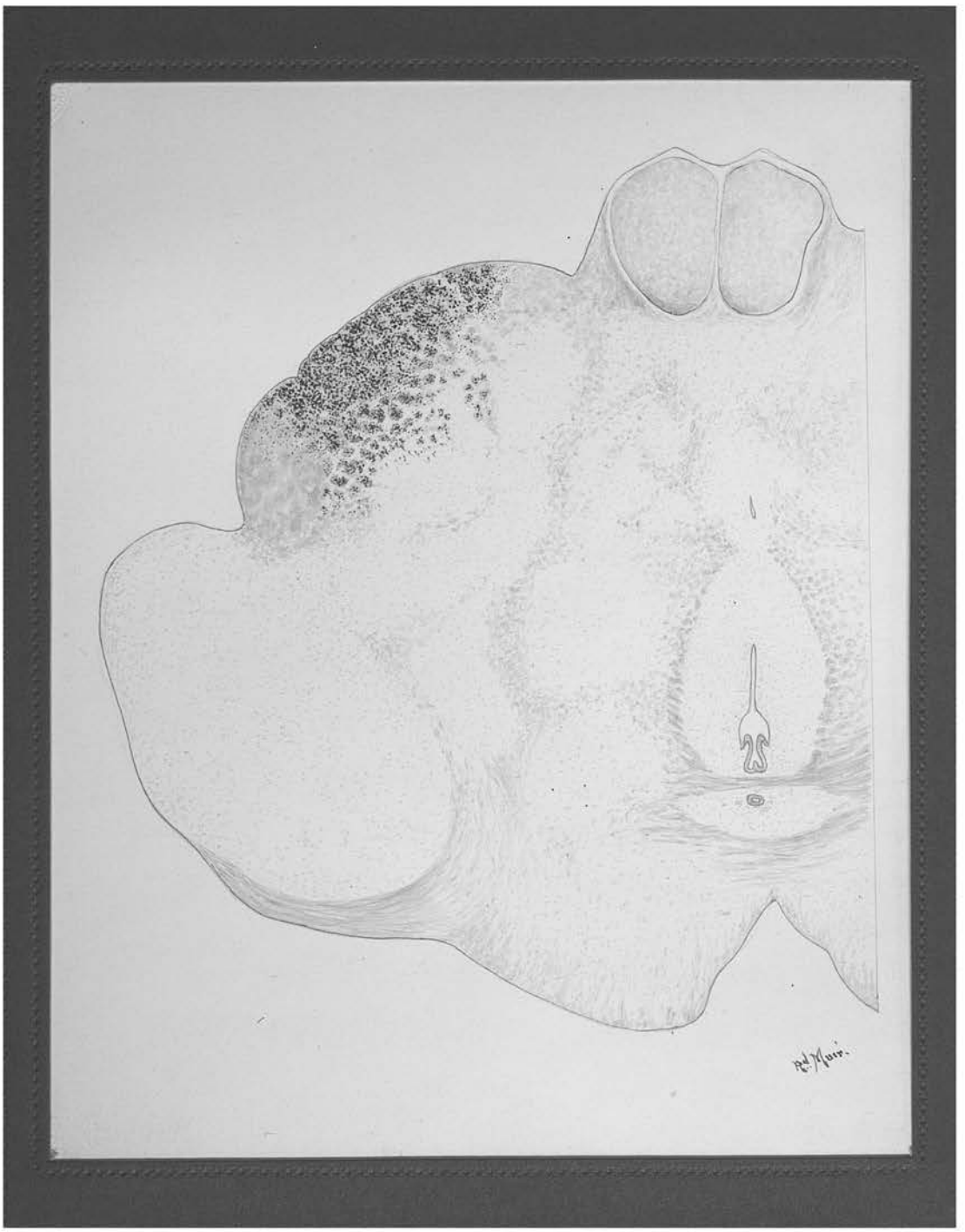
Observe internal capsule degenerated just merging into crusta. There is a considerable amount of fine degenera-tion in the grey matter of the Subthal-amic region. The optic tract is seen ~~bt~~ be-low the crusta or internal capsule.



Dog.

T.S. Upper Part of Mid-brain through Anterior Corpora Quadrigemina. x9.

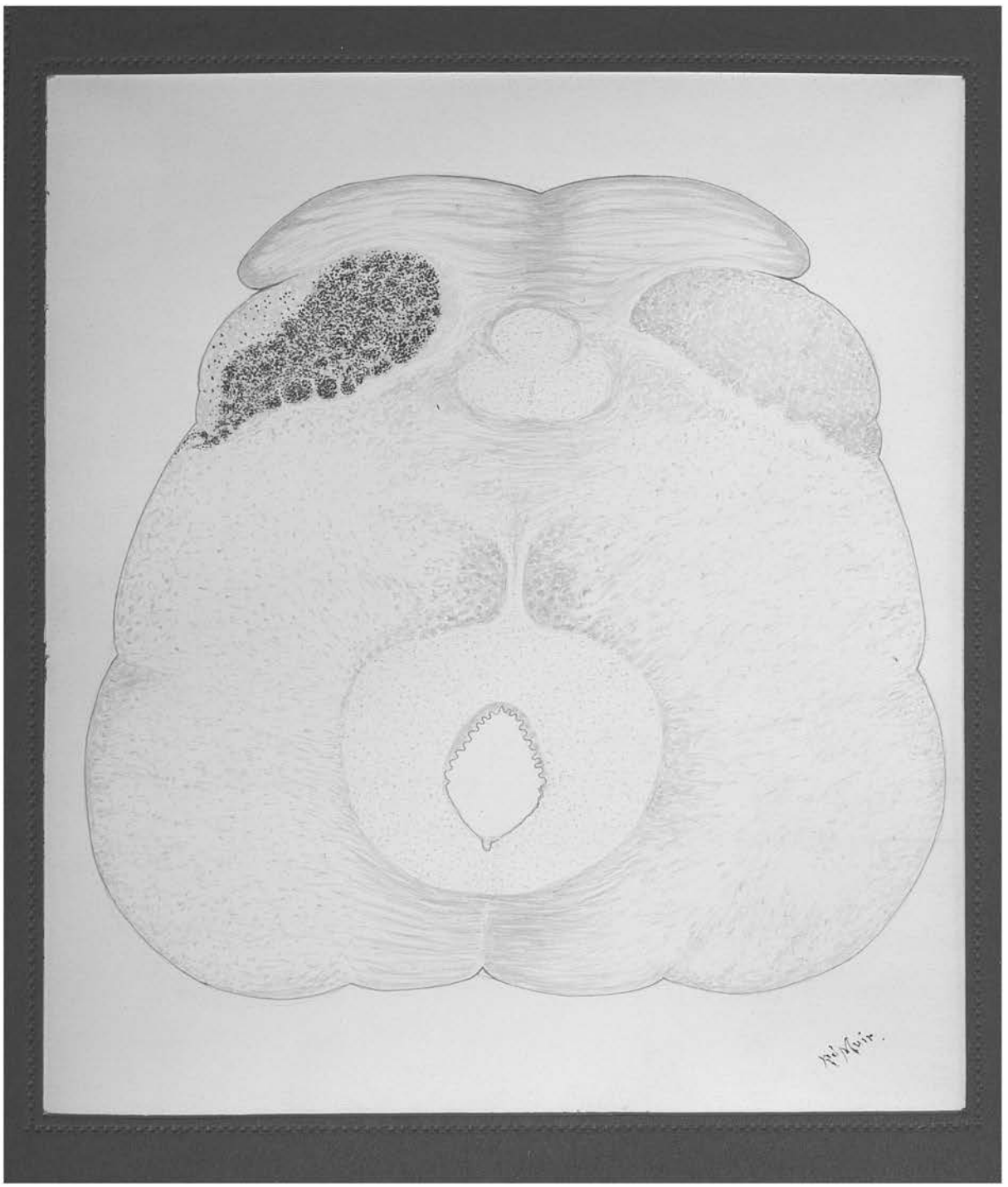
Observe degenerated crusta and posterior to it substantia nigra with a small amount of fine degeneration scattered through it. No fibres pass backwards to the ant. corp. quad. as in the cat.



Dog

T.S. Lower Part of Mid-brain thro' Post. Corp. Quad. x 9

The crusta on the side of the lesion is degenerated: it is about to be broken up into pyramidal bundles of pons at this level.



Dog.

T.S. Pons Varolii somewhat above its middle. x 9

The 4th nerve is seen decussating in the valve of Vieussens.

The pyramidal bundles are degenerated on the side of the lesion and there is abundant fine degeneration scattered amongst the cells of the nucleus pontis also limited to the side of the lesion.

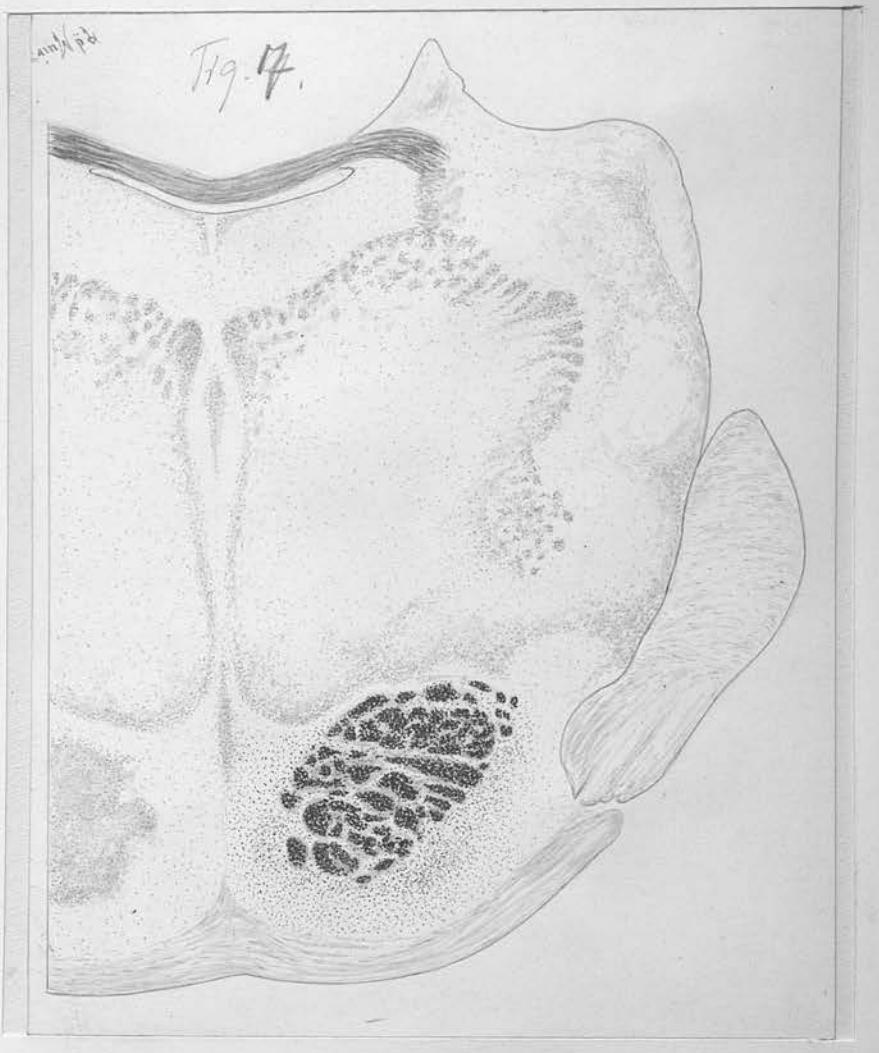
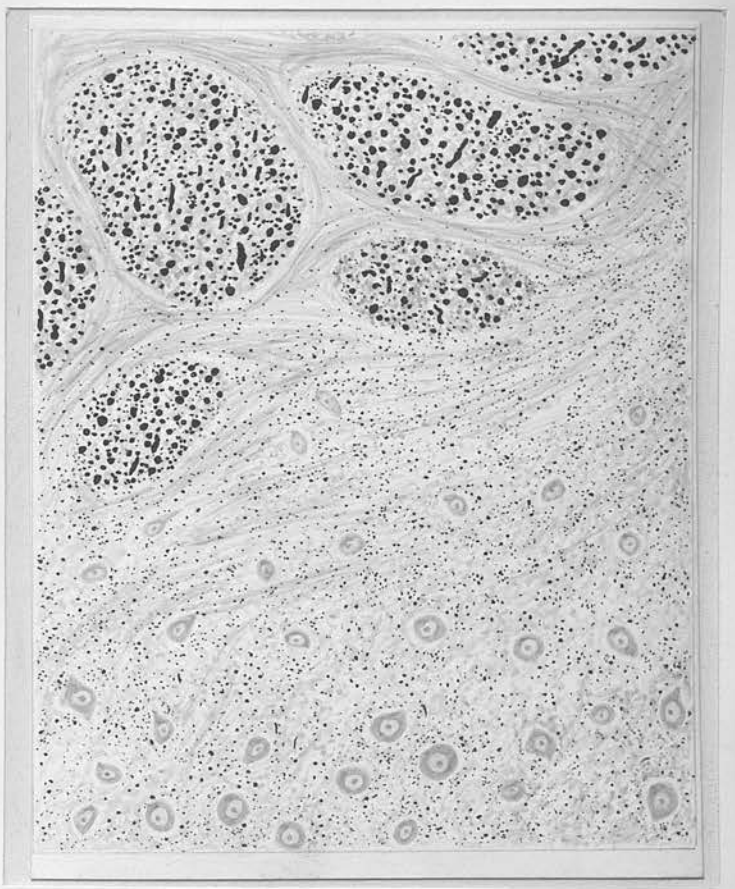


Fig. 17.

Dog.

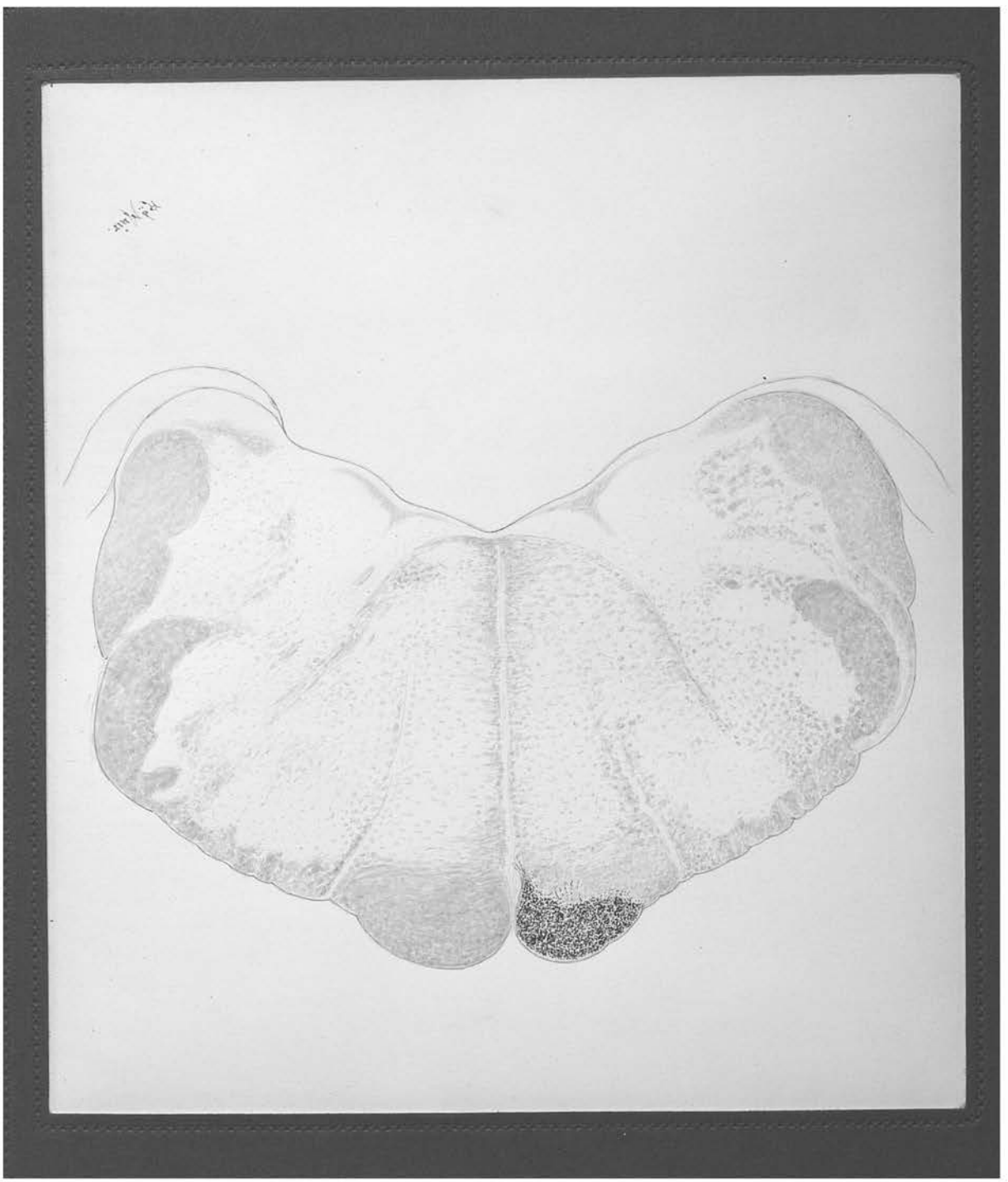
A more highly magnified view (x 100) of a portion of the degenerated pyramidal bundles showing the fine degeneration scattered amongst the cells of the nuclei pontis



Dog.

T.S. Lower Part of Pons. x9

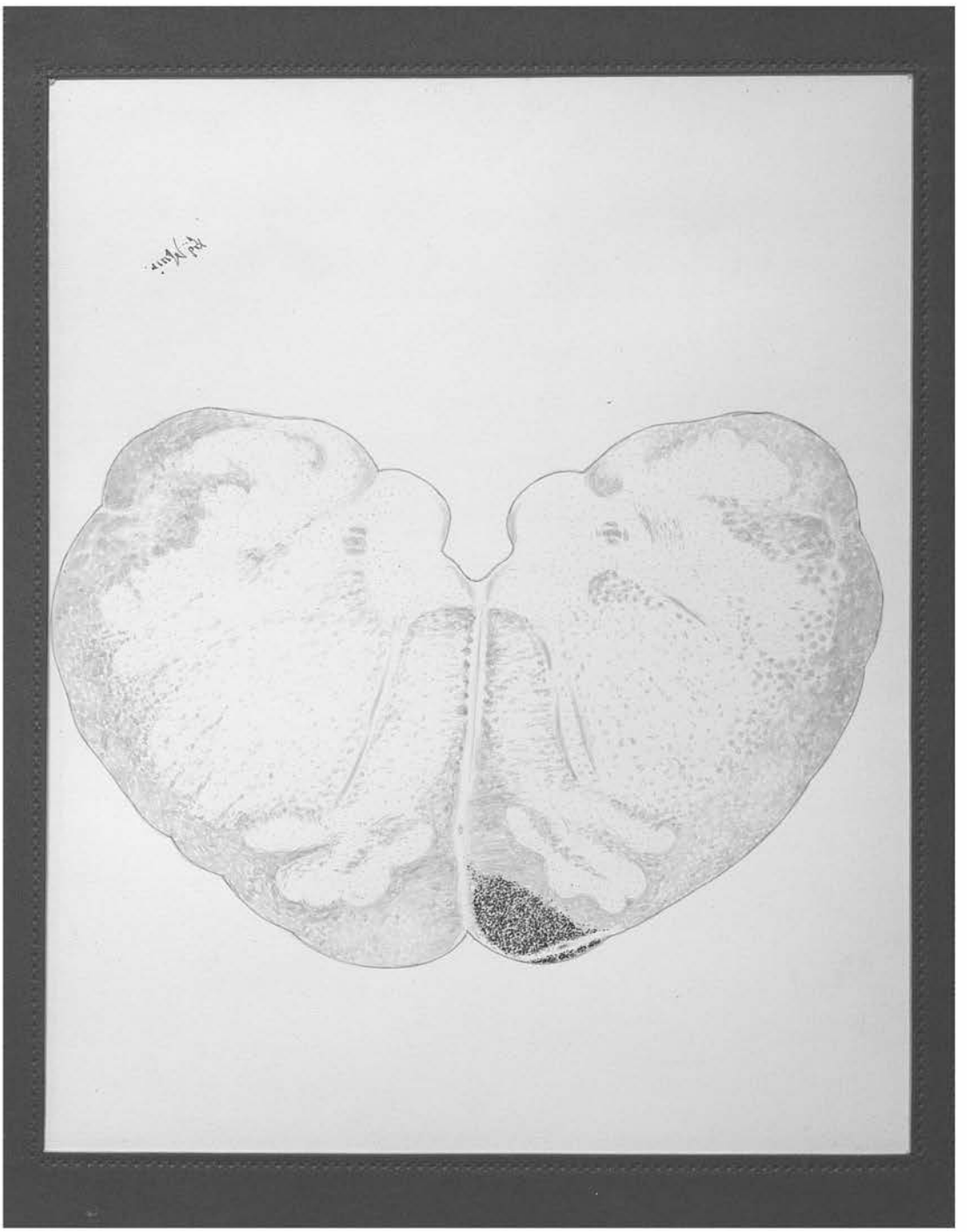
The area in transverse section of the degenerated pyramid is consid-erably smaller than that of the normal one. A few fibres run back-wards from the degenerated pyramid but can only be traced for a very short distance. The 6th nerve is seen emerg-ing lateral to the pyramid on either side.



Dog.

T.S. Medulla Oblongata through lower part of olivary nucleus. x9.

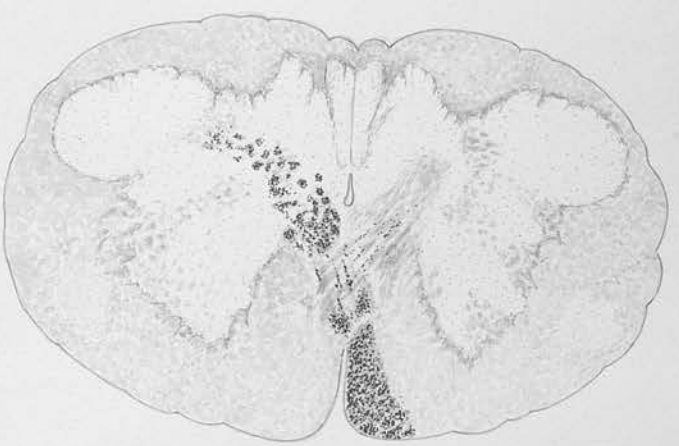
The root bundles of the hypo-glossal nerve are seen leaving the nucleus and running forwards through the reticular formation. No fibres can be seen passing from the degenerated pyramid towards these nuclei.



Dog.

T.S. Medulla Oblongata thro' middle of Pyramidal Decussation.

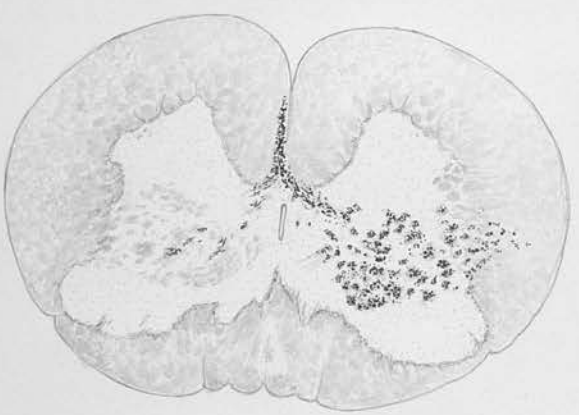
A few homolateral fibres are seen passing from the degenerated pyramid to the same side while most pass across the middle line to the opposite side.



Dog.

T.S. Medulla Oblongata thro' Lower Extremity of Pyramidal Decussn

At this level the homolateral fibres are more numerous.



Dog.

T.S. Spinal Cord — 1st Cervical Segt.

The crossed and direct lateral pyramidal tracts are seen. A few of the bundles have not yet emerged from the grey matter in their course to the lateral column.

Dog.

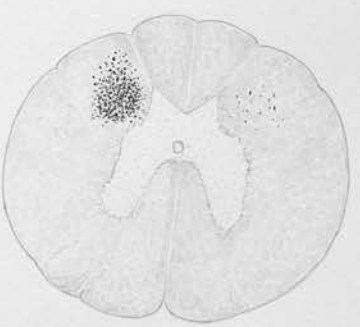
T.S. Spinal Cord – 6th Cervical Segt.

Crossed and direct lateral pyra-
-midal tracts.

Dog.

T.S. Spinal Cord – Mid-dorsal region.

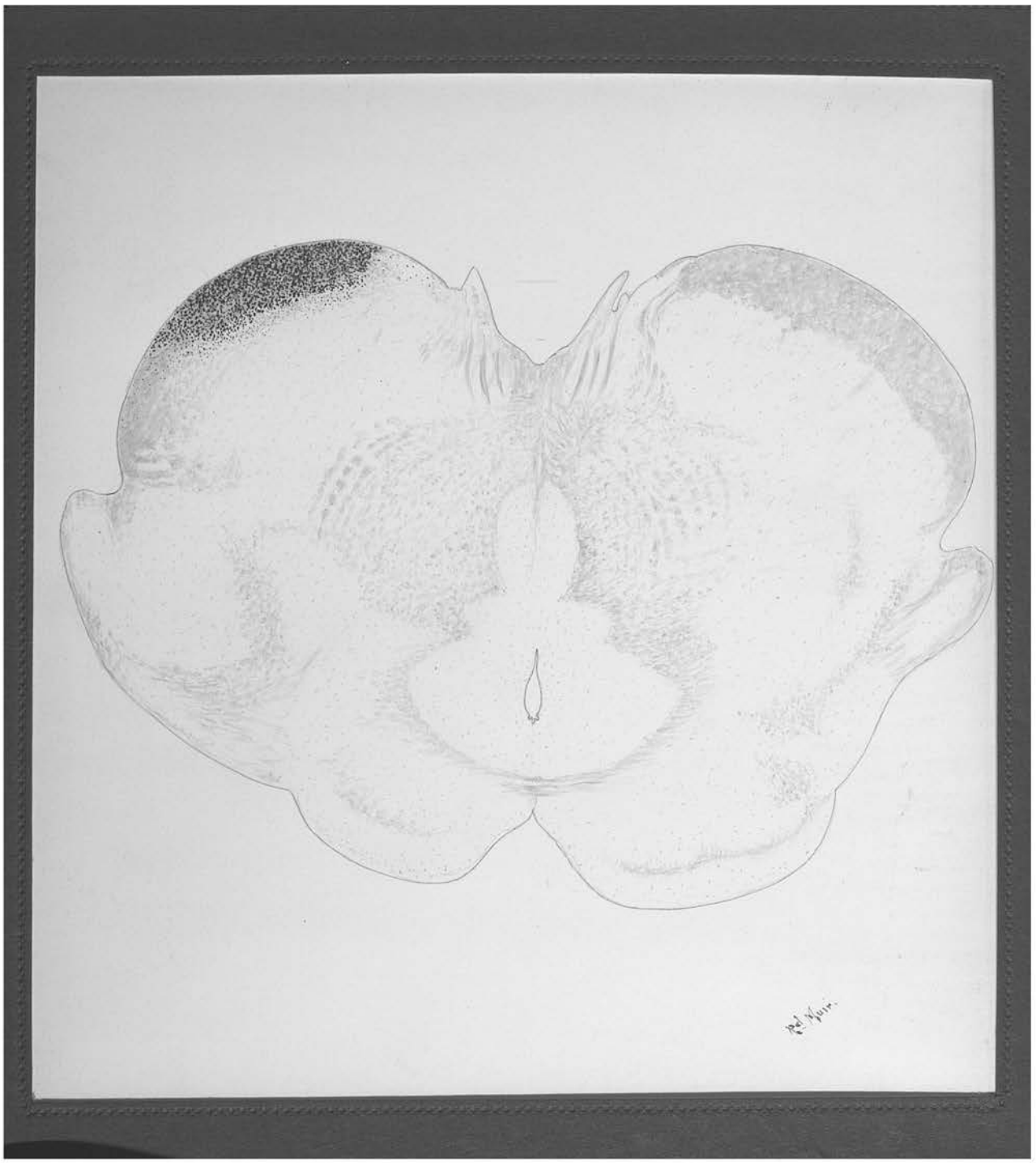
Both crossed and direct pyramidal tracts are smaller in area and contain fewer fibres than in the cervical region.



Monkey — Lesion involved the whole Rolandic area on one side.

T.S. Upper part of Mid-brain thro' Ant. Corp. Quad.

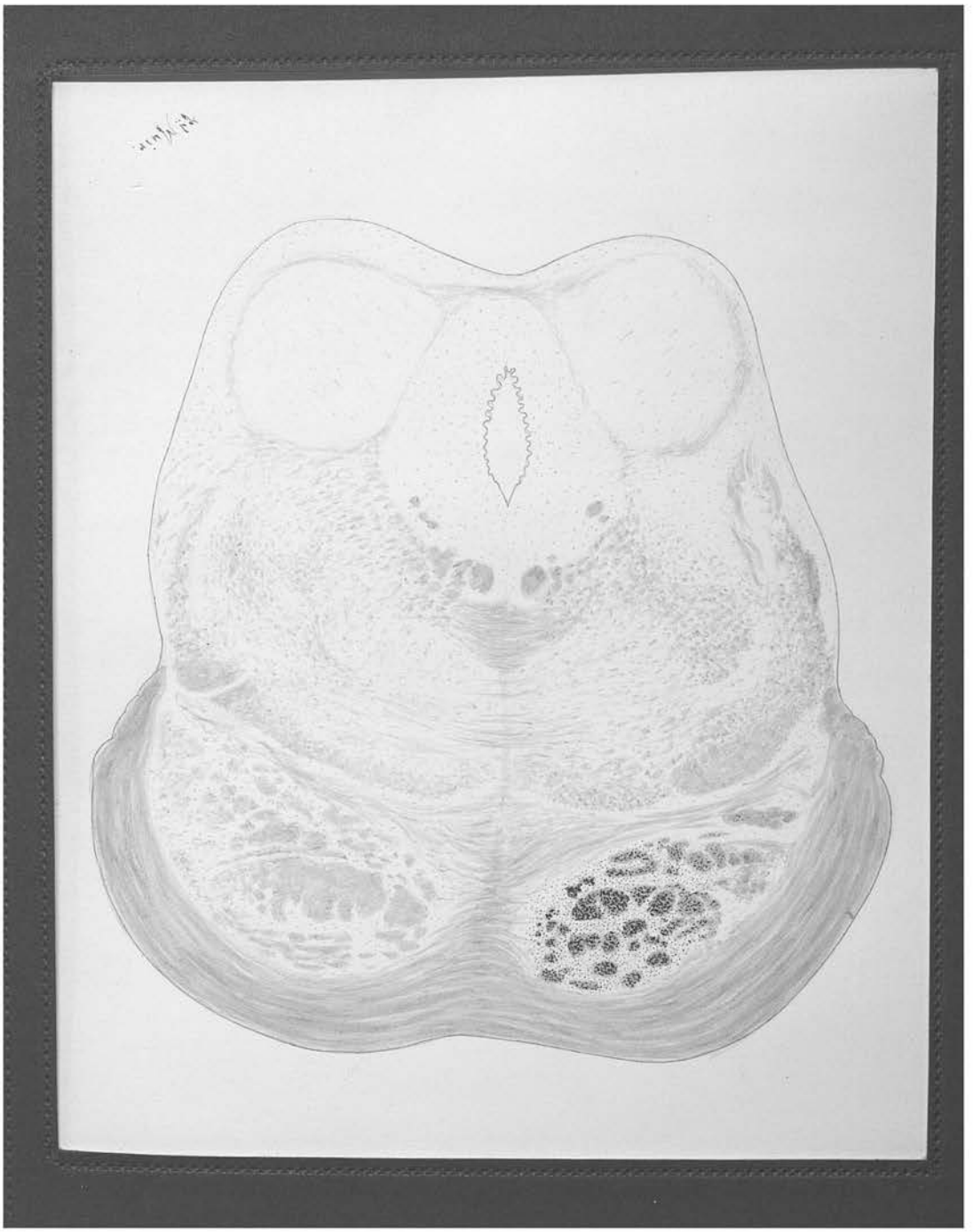
Observe the extent to which the crusta on the side of the lesion is degenerated. No fibres pass backwards to ant. corp. quad.



Monkey

Slightly oblique section passing thro' upper part of pons anteriorly and post. corp. quad. posteriorly.

A considerable amount of fine degeneration is visible in the region of the nuclei pontis around the degenerated pyramidal bundles.



Monkey-

T. S. thro' Middle of Pons.

Shows fine degeneration in region of nuclei pontis on side of lesion as in last drawing.

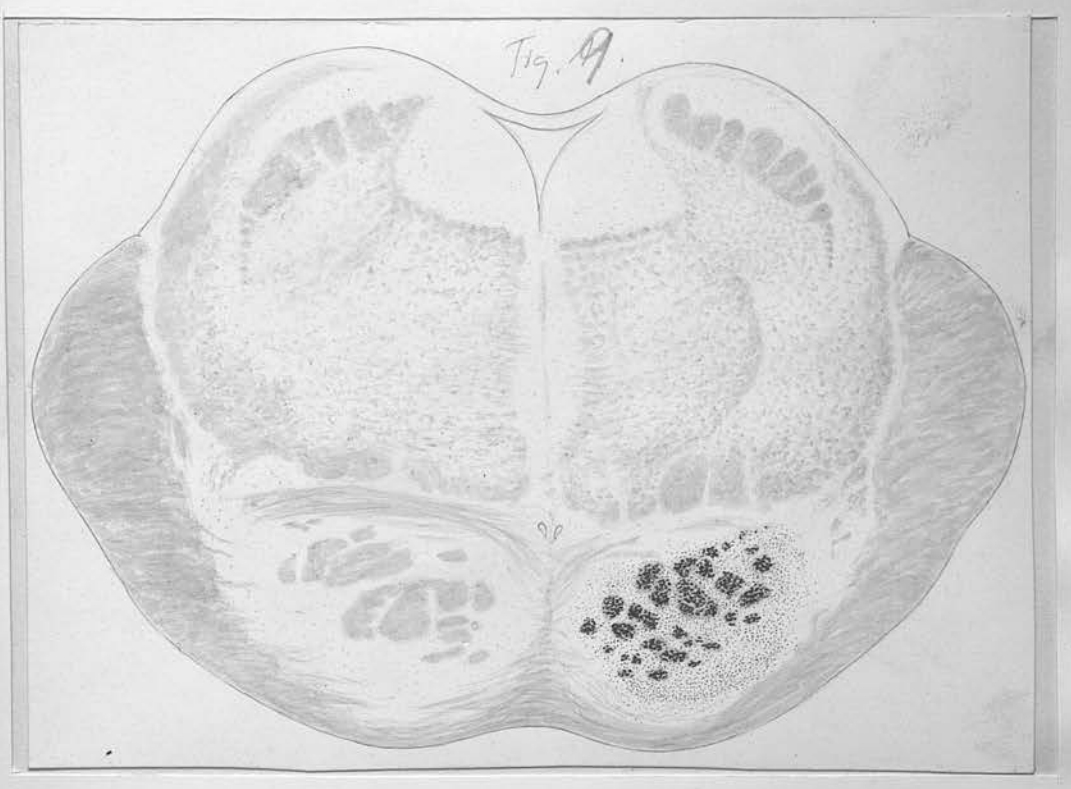
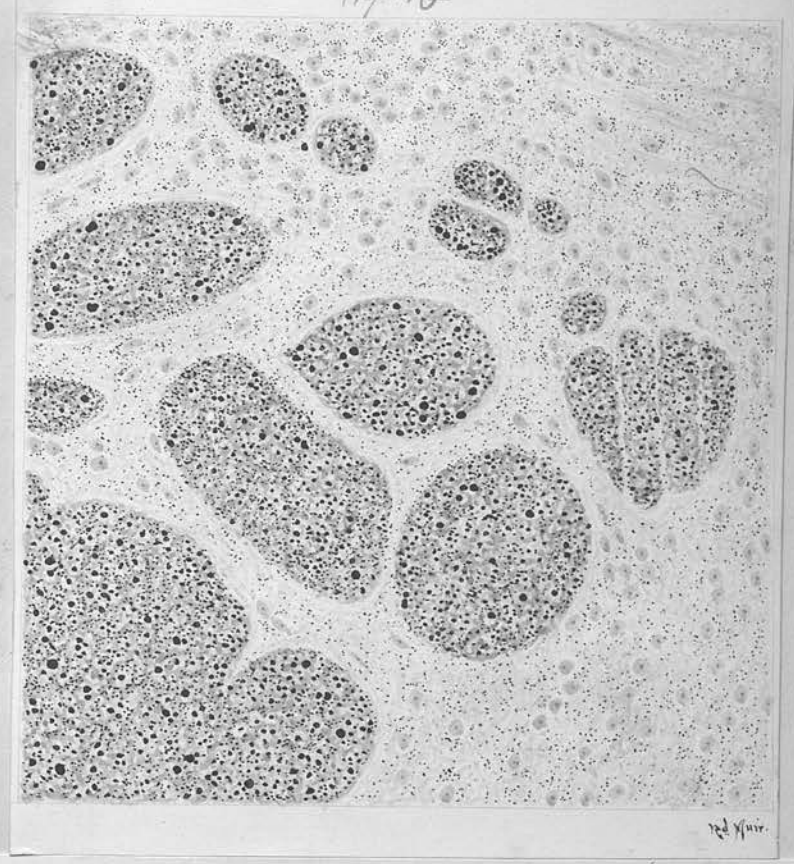


Fig. A.

Monkey.

A more highly magnified view of the degenerated pyramidal bundles seen in the last drawing with the grey matter of the nuclei pontis around them. The cells are indicated by blue and the fine degeneration by the small black dots.

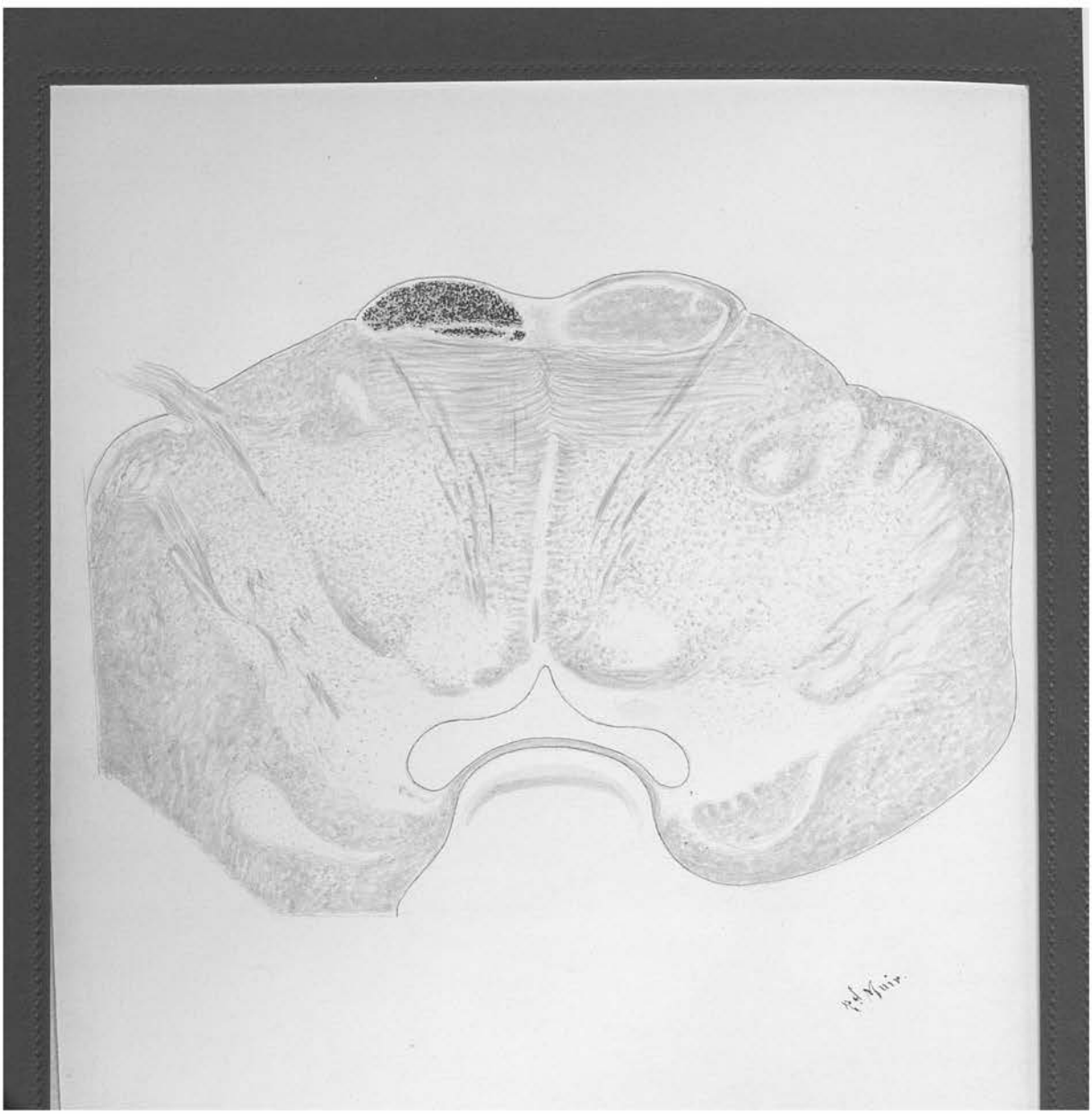
Fig 10



Monkey-

T.S. Lower Part of Pons

No fibres run backwards from the degenerated pyramid. The 6th and 7th nerve-root bundles are seen in this section.



Monkey.

T.S. Medulla Oblongata thro' Lower Part of Olive.

A few fibres appear to be leaving the postero-internal angle of the degenerated pyramid but they cannot be traced across the middle line.

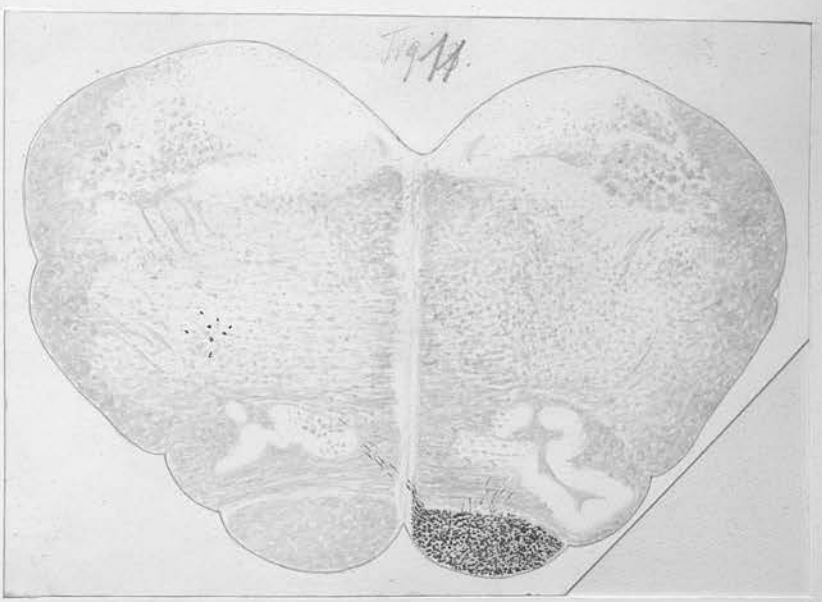
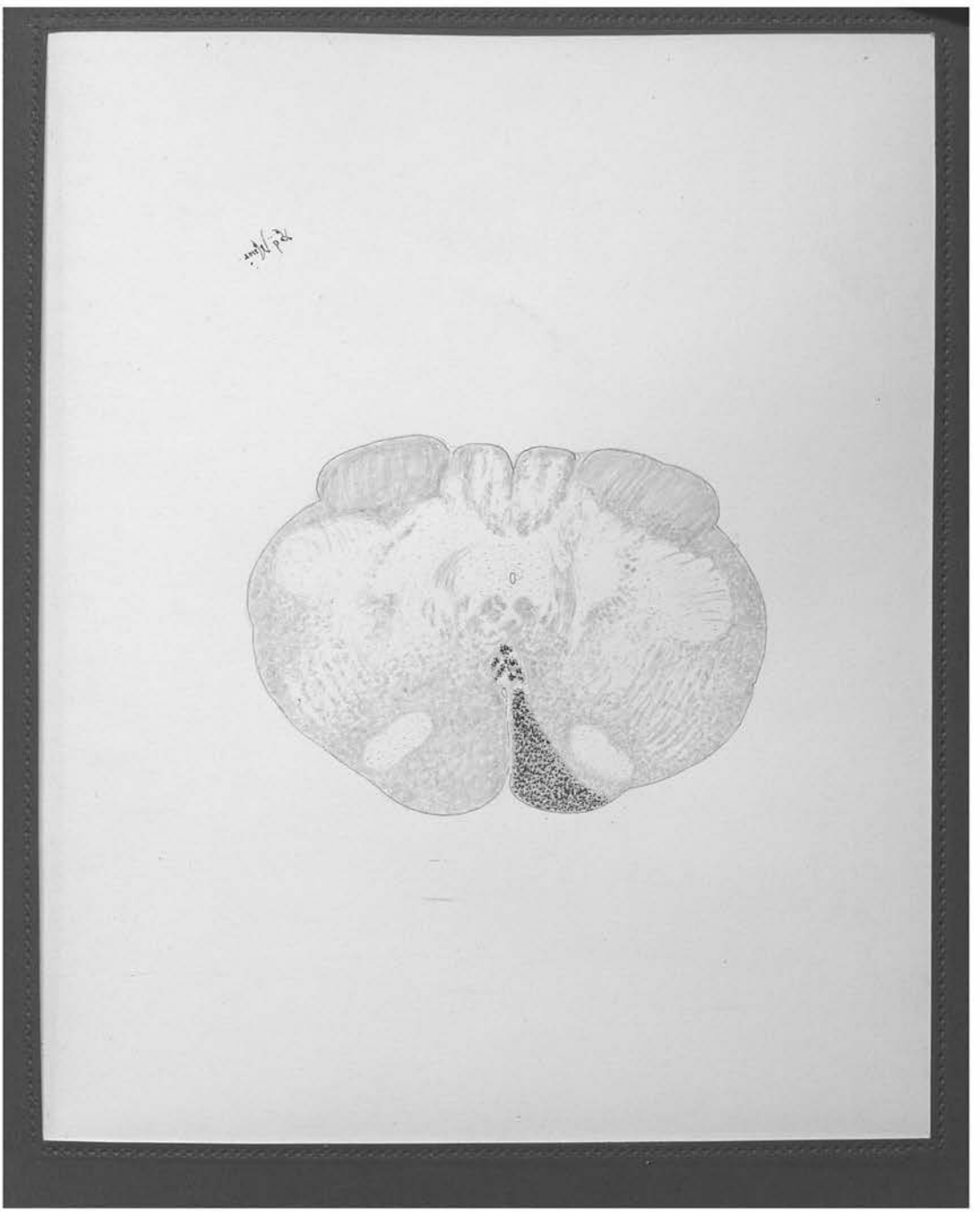


Fig 11.

Monkey.

T.S. Medulla Oblongata thro' Upper Part of Pyramidal Decussation.

No homolateral fibres are seen at this level.



Monkey.

T.S. Medulla Oblongata thro' Middle of Pyramidal Decussation.

No homolateral fibres at this level.

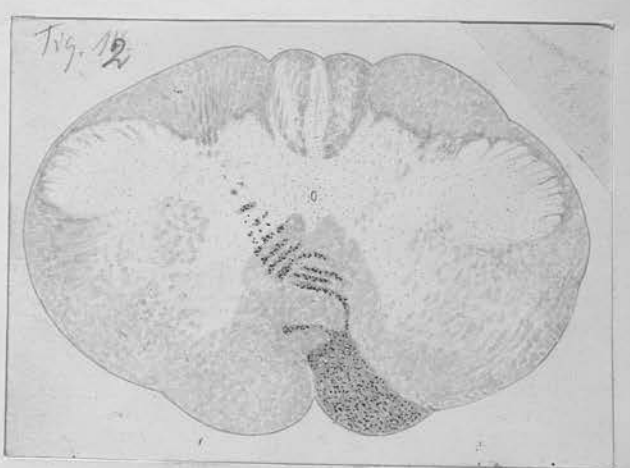


Fig. 12

Monkey.

T.S. Medulla Oblongata thro'
Lower Part of Pyramidal Decussation

Observe homolateral fibres leaving the degenerated pyramid and curv-ing round in the grey matter to the same side (side of lesion)

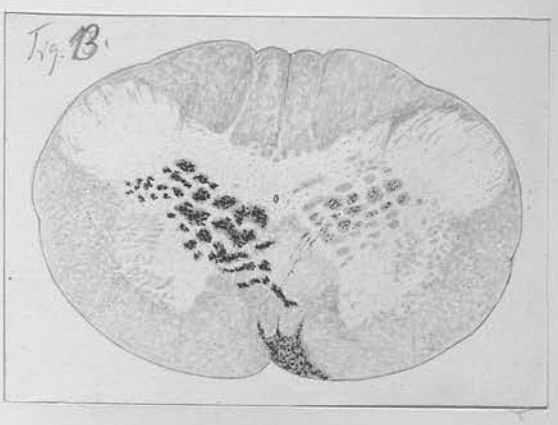


Fig. B.

Monkey

T.S. Spinal Cord – 7th Cervical Segt

The crossed pyramidal tract occupies a much more extensive area, relatively and absolutely, than it does in the cat or dog. The direct cerebellar tract is clearly defined between the pyramidal tract and the margin. A few fibres may be seen passing in towards the base of the ~~anterior~~ posterior horn and ~~pro~~ there is fine degeneration in the grey matter in this position. A few scattered degenerated fibres can be made out in the crossed pyramidal tract of the side of the lesion, but there is no sign of any direct anterior pyramidal tract.

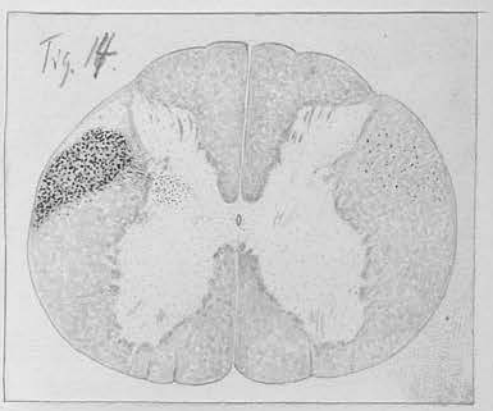


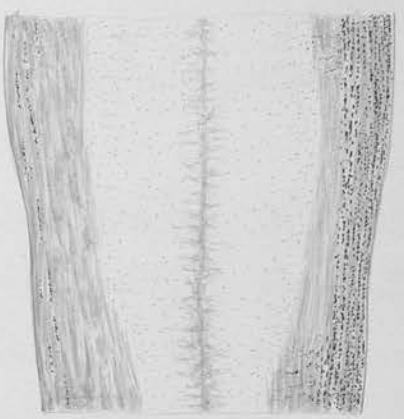
Fig. 14.

Monkey

Lateral Longitudinal Section passing through the crossed pyramidal tract at the junction of the cervical and dorsal regions.

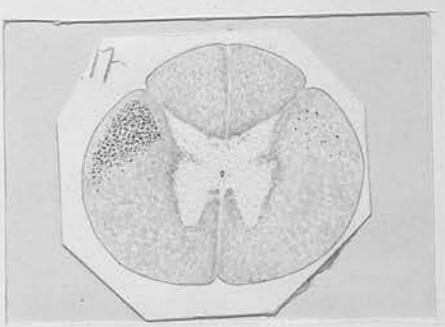
(The drawing has been reversed)

Observe the pyramidal fibres cut longitudinally (degenerated and indicated by the interrupted black lines) and from these one or two collaterals passing in towards grey matter.



Monkey-

T.S. Spinal Cord – 4th Dorsal Segt


17

Monkey

T.S. Spinal Cord — 4th Lumbar Segt

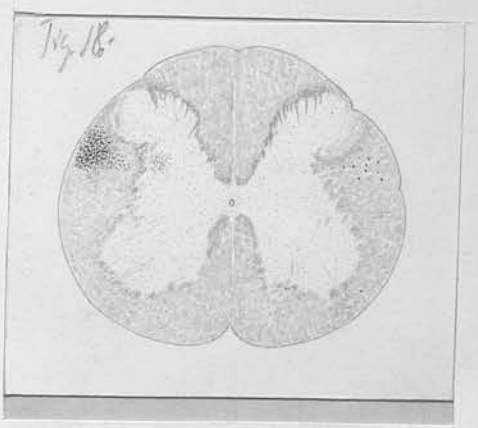


Fig 18.

Monkey-

T.S. Spinal Cord – 4th Sacral Segt.


Fig 11.